Date: Sat, 4 Dec 93 04:30:36 PST
From: Ham-Space Mailing List and Newsgroup <ham-space@ucsd.edu>
Errors-To: Ham-Space-Errors@UCSD.Edu
Reply-To: Ham-Space@UCSD.Edu
Precedence: Bulk
Subject: Ham-Space Digest V93 #99
To: Ham-Space

Ham-Space Digest   Sat, 4 Dec 93   Volume 93 : Issue   99

Today's Topics:

Send Replies or notes for publication to: <Ham-Space@UCSD.Edu>
Send subscription requests to: <Ham-Space-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Space Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-space".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: Sun, 28 Nov 1993 11:12:40 MST
From: tribune.usask.ca!kakwa.ucs.ualberta.ca!alberta!nebulus!ve6mgs!
usenet@decwrl.dec.com
Subject: ANS-331 BULLETINS
To: ham-space@ucsd.edu

SB SAT @ AMSAT $ANS-331.01
MICROSAT ANTENNA POLARIZATION

HR AMSAT NEWS SERVICE BULLETIN 331.01 FROM AMSAT HQ
SILVER SPRING, MD NOVEMBER 27, 1993
TO ALL RADIO AMATEURS BT
BID: $ANS-331.01

WD0E Explains MICROSAT Antenna Polarization

There have been quite a few question raised recently regarding the sense of

polarization of the MICROSATs. Jim White (WD0E) sheds some light on the subject with the following: "There has been a certain amount of confusion about the sense of the polarization of the MICROSAT down links. The following is an attempt to clarify it. The two transmitters in each MICROSAT are connected to the canted turnstile downlink antenna through a hybrid. The two input ports they are connected to are out of phase with each other. So when one transmitter is on the sense of the downlink will be RHCP and when the other is on it will be LHCP. When we switch trans-mitters, we also switch polarization sense. No sense is 'normal'. During construction there was no attempt to make a particular transmitter a particular sense. The limiting factor was how to fit the semi-rigid cables connecting all the various parts together in the tiny space inside the transmitter module. Additionally, since one of the objectives of the MICROSAT Project was to create satellites that could be used with very simple portable ground stations using simple omni-directional antennas, there was no need to be concerned about sense. When receiving with a circularly polarized ground antennas, miss-matched sense can make several dB of difference at times. The most strongly circular signal will be received by the ground station when the bottom of the satellite is pointed directly at it. For stations at about 35 to 50 degrees north or south latitude, this happens when the satellites are directly overhead and slightly lower in latitude. (For all but LO-19 the turnstile is pointed down in the northern hemisphere, for LO-19 it's down in the southern hemisphere). At other times the sense is effected by a variety of other influences and cannot be relied on. If you have a circularly polarized Yagi with swit-chable sense you can do a test yourself to see which transmitter provides which sense. Throughout a pass, but particularly when the satellite is nearly overhead, switch the antenna sense every few seconds and see which is stronger. At times you will notice a large difference (AO-16 is 5 S units different on my TS-811). The sense that provides the strongest signal over the majority of the pass is the sense of the downlink for that trans-mitter. And for all but DOVE, it also correlates to the frequency, since the 70 cm transmitters are all on different frequencies. DOVE is a special case since it's two transmitters are on nearly the same frequency. To make the correlations yourself on DOVE you would need to do the same test as above, but also check which transmitter is in use as indicated by the STATUS line. We normally run TX#2 on DOVE because it is more efficient.
Here is a chart I have hanging on my wall to remind me of which sense to use."

WD0E welcomes confirmations of these observations:

WO-18:
437.075 PSK LHCP (this TX is bad and not normally used)
437.100 RC RHCP (normally in use)

LO-19:

437.153 PSK LHCP
437.125 RC/CW RHCP

AO-16:
437.025 PSK LHCP (not presently in use)
437.050 RC RHCP (in use now)

DO-17:
145.825 TX#1 LHCP
145.825 TX#2 RHCP (normally used, and in use now)

[The AMSAT News Service (ANS) would like to thank Jim White (WD0E) for this bulletin item. Jim White's Internet address is: wd0e@amsat.org]

/EX
SB SAT @ AMSAT $ANS-331.02
LANDLINE BBS WITH ANS BULLEINS

HR AMSAT NEWS SERVICE BULLETIN 331.02 FROM AMSAT HQ
SILVER SPRING, MD NOVEMBER 27, 1993
TO ALL RADIO AMATEURS BT
BID: $ANS-331.02

The AMSAT BBS Network now includes the following BBS's:

     CompuServe's HAMNET
Phone: (Local Access)
Location: USA
Baud Rate: Up To 14,400bps
Sysop: Scott Loftness (W3VS)

     Western Pacific Database
Phone: 415-453-2854
Location: San Rafael, CA
Baud Rate: Up to 14,400bps V.32bis
Sysop: Daniel C. Dufficy (KH8AF)

     The ARRL BBS
Phone: 203-666-0578
Location: Newington, CT
Baud Rate: Up To 14,400bps
Sysop: Luck Hurder (KY1T)

     California Amateur Radio Emergency Services (CARES) BBS
Phone: 916-323-4826
Location: Sacramento, CA

Sysop: Gorden Fuller (WB6OVH)

AMSAT East Coast Bulletin Board
Phone: 201-261-2780
Location: New Milford, New Jersey
Baud Rate: Up to 14,400bps
Sysop: Mel Roman (KA2UPD)

HAM>LINK<RBBS
Phone: 612-426-0000
Location: St. Paul, Minnesota
Baud Rate: Up to 9600bps V.32
Sysop: John Desmond (K0TG)

OCA/AMSAT BBS
Phone: 714-738-4331
Location: Fullerton, CA
Baud Rate: Up to 24000bps
Sysop: John Wisniowski (N6DBF)

DRIG BBS
Phone: 214-394-7438
Location: Carrolton, TX
Baud Rate: Up To 14,400bps
Sysop: Jeff Wallach (N5ITU)

GEnie's Radio, Electronics, & Broadcasting RoundTable
Phone: Call 800-638-9638 for information and local access phone number
Location: USA
Baud Rate: Up To 9600bps
Sysop: Larry Ledlow (NA5E)

PC-Ham (Reliable) BBS
Phone: 301-593-9067
Location: Silver Springs, MD
Baud Rate: Up To 9600bps
Sysop: Joe Kasser (W3/G3ZCZ)

The WireNet BBS
Phone: 205-444-9638
Location: Birmingham, Alabama
Baud Rate: Up To 14,400bps
Sysop: Dennis Dease (N4NR)

Top of The Rock BBS
Phone: 404-921-8687
Location: Lilburn, GA
Baud Rate: Up To 14,400bps

Sysop: Steve Driggs (KB4ZTN)

     USS Enterprise 1701-D BBS
Phone: 717-752-1468
Location: Berwick, PA
Baud Rate: Up To 2400bps
Sysop: Bill Barnes (N3JIX)

If you run a BBS and would like to join The AMSAT BBS Network, we want to hear from you. Tell us the name of your BBS, phone number, location (city, state), baud rate, sysop's name and callsign, and Internet and/or CompuServe address. Also, what AMSAT, ARRL, etc. files do you post each week?

     You can contact me on:
                          >INTERNET:n6dbf@amsat.org
                                    or
                           CompuServe: 70233,75

73, John Wisniowski (N6DBF)
    AMSAT-NA, BBS Coordinator

/EX
SB SAT @ AMSAT $ANS-331.03
AMSAT OPS NET SCHEDULE

HR AMSAT NEWS SERVICE BULLETIN 331.03 FROM AMSAT HQ
SILVER SPRING, MD NOVEMBER 27, 1993
TO ALL RADIO AMATEURS BT
BID: $ANS-331.03

Current AMSAT Operations Net Schedule For AO-13

AMSAT Operations Nets are planned for the following times. Mode-B Nets are conducted on AO-13 on a downlink frequency of 145.950 MHz. If, at the start of the OPS Net, the frequency of 145.950 MHz is being used for a QSO, OPS Net enthusiasts are asked to move to the alternate frequency of 145.955 MHz.

Date	UTC	Mode	Phs	NCS	Alt NCS
12-Dec-93	0435	B	180	W9ODI	WB6LLO
3-Jan-94	0200	B	160	WA5ZIB	N7NQM

Any stations with information on current events would be most welcomed. Also, those interested in discussing technical issues or who have questions about any particular aspect of OSCAR statellite operations, are encouraged

to join the OPS Nets. In the unlikely event that either the Net Control Station (NCS) or the alternate NCS do not call on frequency, any participant is invited to act as the NCS.

****

Slow Scan Television on AO-13

SSTV sessions will be held on immediately after the OPS Nets a downlink on a Mode-B downlink frequency 145.960 MHz.

/EX
SB SAT @ AMSAT $ANS-331.04
WEEKLY OSCAR STATUS REPORTS

HR AMSAT NEWS SERVICE BULLETIN 331.04 FROM AMSAT HQ
SILVER SPRING, MD NOVEMBER 27, 1993
TO ALL RADIO AMATEURS BT
BID: $ANS-331.04

Weekly OSCAR Status Reports: 27-NOV-93

AO-13: Current Transponder Operating Schedule:
L QST *** AO-13 TRANSPONDER SCHEDULE *** 1993 Nov 15-Jan 31
Mode-B : MA   0 to MA 95 !   / Eclipses, max
Mode-B : MA 95 to MA 180 ! OFF Dec 07 - 24. < duration 136
Mode-B : MA 180 to MA 218 !   \ minutes.
Mode-S : MA 218 to MA 220 !<- S beacon only
Mode-S : MA 220 to MA 230 !<- S transponder; B trsp. is OFF
Mode-BS : MA 230 to MA 256 !   Blon/Blat 240/-5
Omnis   : MA 250 to MA 150 ! Move to attitude 180/0, Jan 31
AO-13 will experience another partial solar eclipse on 1993 Dec 13 [Mon]. It sees the Moon eclipse the Sun from 10:09 - 10:59 UTC with a maximum 53% obscuration at 10:34 UTC. This is Orbit #4211 MA 73-92. The encounter will be "visible" on the telemetry to stations throughout the USA and Japan. Reports would be appreciated. Stations who observed this spectacular eclipse of Dec 13 will know what to look for. Eclipses of sun by earth commence on Dec 07 [Tue] and continue until Dec 24 [Fri]. The eclipses are of course total. The maximum lasts 2 hours and 16 minutes, and is the longest AO-13 has ever experienced. The telemetry during these outages is very interesting, particularly the spacecraft temperatures; some reach -40 C. The Mode-B transponder will be OFF from MA 95 to 180 during this two week period. [G3RUH/DB2OS/VK5AGR]

FO-20: The following is the FO-20 operating schedule:
              Analog mode: 01-Dec-93 08:43 -to- 07-Dec-93 7:16 UTC
                           15-Dec-93 07:41 -to- 22-Dec-93 8:05 UTC
       Digital mode: otherwise noted above. In December, analog mode and

digital mode will be ON alternately for a week, respectively.
[JJ1WTK]

RS-12: RS-12 was very active on the East Coast and Midwest passes during this last week. Not so active on the West Coast passes. XE1YMY has been worked many times by RS-12 users in Canada, Arizona, and Texas. Also, a YV5 station was heard calling on 15M with no responses! And one can also hear JA stations calling on RS-12 in the late evening West Coast passes. [KF5WY]

The AMSAT NEWS Service (ANS) is looking for volunteers to contribute weekly OSCAR status reports. If you have a favorite OSCAR which you work on a regular basis and would like to contribute to this bulletin, please send your observations to WD0HHU at his CompuServe address of 70524,2272, on INTERNET at wd0hhu@amsat.org, or to his local packet BBS in the Denver, CO area, WD0HHU @ W0LJF.#NECO.CO.USA.NOAM. Also, if you find that the current set of orbital elements are not generating the correct AOS/LOS times at your QTH, PLEASE INCLUDE THAT INFORMATION AS WELL. The information you provide will be of value to all OSCAR enthusiasts.

/EX

Date: Tue, 30 Nov 1993 09:21:38 -0700
From: tribune.usask.ca!kakwa.ucs.ualberta.ca!alberta!nebulus!ve6mgs!usenet@decwrl.dec.com
Subject: ARLK050 Keplerian data
To: ham-space@ucsd.edu

SB KEP @ ARL $ARLK050
ARLK050 Keplerian data

ZCZC SK62
QST de W1AW
Keplerian Bulletin 50 ARLK050

Date: 1 Dec 1993 03:12:06 -0800
From: swrinde!cs.utexas.edu!howland.reston.ans.net!vixen.cso.uiuc.edu!qualcomm.com!qualcomm.com!not-for-mail@network.ucsd.edu
Subject: Control of Amateur Satellites
To: ham-space@ucsd.edu

In article <754701099snz@cosmo.demon.co.uk>,
Chris Payne <chris@cosmo.demon.co.uk> wrote:
>In article <2dc7cg$2sa@qualcomm.com> antonio@qualcomm.com writes:

>>For attitude determination, almost all have used sun and earth sensors.
>>The UoSat series, built at U. of Surrey, have used flux-gate magnetometers.
>>P3D, now under design, and the most ambitious amateur satellite to date,
>>is planned to use GPS for attitude determination.
>
>As far as I know, GPS is only usable for _orbit_ determination, i.e. location
>in space, and _not_ for attitude determination, i.e. which way the satellite
>is pointing. Of course, correct if me if I'm wrong!

GPS can be used for _both_ orbit determination and attitude determination.
That, in fact, is the intent on P3D. I mentioned only attitude determination
because that's what the original question asked.

The method involves multiple antennas, and differential carrier phase
measurements. The wavelength of the GPS carrier is about one foot.
Carrier phase changes 360 degrees in one wavelength. Suppose you can measure
the relative carrier phase of the signal received via two different
antennas to an accuracy of 3.6 degrees. (I just picked that because
it's 1/100th of a full circle, so it makes the math easy.) So that's
a measurement of carrier phase that's accurate to about 1/100th of a
foot. Now suppose that two antennas on the spacecraft are 5 feet apart.
The accuracy with which we can determine the attitude of the spacecraft
is then on the order of atan(.01/5) = 0.1 degree.

Of course, you can make such measurements using more than one GPS satellite
source, and you can average multiple measurements to improve accuracy.

This is intended to be only a conceptual description, so I've left out
a number of details, but I hope you get the idea. In practice, the
satellite needs several GPS antennas to make this work, so that you have
a high probability of multiple GPS antennas facing toward a GPS satellite
no matter what your attitude is, etc.

This high-tech stuff is always done first on amateur satellites :-).

Date: 2 Dec 1993 07:15 EDT
From: ucsnews!sol.ctr.columbia.edu!emory!europa.eng.gtefsd.com!news.umbc.edu!
haven.umd.edu!cs.umd.edu!skates.gsfc.nasa.gov!nssdca.gsfc.nasa.gov!
stocker@network.ucsd.edu
Subject: NASA STS-61 Shuttle Retransmissions
To: ham-space@ucsd.edu

INTERESTED IN THE HST REPAIR MISSION

The Goddard Amateur Radio Club (GARC) W3NAN invites interested people to tune
in to Shuttle transmissions. As a public service to the Amateur radio

community, the GARC retransmits space shuttle air-to-ground communications. During the STS-61 mission, Amateur radio operators, shortwave listeners, and those individuals with scanners can listen to these communications on the following HF (single side band) and VHF frequencies:

        3.860 MHz (lower sideband)
        7.185 MHz (lower sideband)
        14.295 MHz (upper sideband)
        21.395 Mhz (upper sideband)
        28.650 Mhz (upper sideband)

                and

        147.45 Mhz (FM)

Erich Stocker
N3OXM
Public Information Coordinator (GARC)

Date: 3 Dec 93 15:39:40 GMT
From: ogicse!emory!europa.eng.gtefsd.com!howland.reston.ans.net!
usenet.ins.cwru.edu!cleveland.Freenet.Edu!at017@network.ucsd.edu
Subject: STS-61 Orbital Elements
To: ham-space@ucsd.edu

Does anyone have the two line orbital elements for the space shuttle?
--
Ronald Wolenski   at017@cleveland.freenet.edu
N8WCR
Parma, Ohio

Date: Thu, 2 Dec 1993 02:25:41 PST
From: ucsnews!sol.ctr.columbia.edu!math.ohio-state.edu!sdd.hp.com!sgiblab!
barrnet.net!infoserv!cpuig!cpuig@network.ucsd.edu
Subject: What are Global Positioning satellite frequencies?
To: ham-space@ucsd.edu

LIBRARY@utkvx.utk.edu writes:

>
> Does anyone know where I can get technical data on the global
> positioning system satellites? Specifically I would like to know their
> frequencies, modulation type, data format and how many of them are
> presently in orbit. It would also be interesting to know their norad

> designation, orbital elements and some spacecraft statistics like
> power source and rf transmit power.
>
> I have found lots of information on how to use the equipment but
> nothing technical on the whole system.
>

The current issue (December 1993) of IEEE Spectrum magazine has a very
informative article (starting on p. 36) with the information you need.
It provides a historical overview of radio-positioning systems.

--
Carlos Puig, KJ6ST cpuig@infoserv.com Campbell, CA

Date: (null)
From: (null)
SB KEP ARL ARLK050
ARLK050 Keplerian data

Thanks to NASA, AMSAT and N3FKV for the following Keplerian data.

Decode 2-line elsets with the following key:
1 AAAAAU 00 0 0 BBBBB.BBBBBBBB .CCCCCCCC 00000-0 00000-0 0 DDDZ
2 AAAAA EEE.EEEE FFF.FFFF GGGGGGG HHH.HHHH III.IIII JJ.JJJJJJJJKKKKKZ
KEY: A-CATALOGNUM B-EPOCHTIME C-DECAY D-ELSETNUM E-INCLINATION F-RAAN
G-ECCENTRICITY H-ARGPERIGEE I-MNANOM J-MNMOTION K-ORBITNUM Z-CHECKSUM

AO-10
1 14129U 83058 B 93328.37358304 0.00000006   10000-3 0 2126
2 14129 27.1967 354.6814 6020029 132.8205 296.5509 2.05877703 50585
RS-10/11
1 18129U 87054 A 93325.49625370 0.00000016   10683-4 0 8136
2 18129 82.9207 122.3575 0010357 239.9809 120.0325 13.72326180321420
UO-11
1 14781U 84021 B 93329.58852952 0.00000248   46105-4 0 6143
2 14781 97.7948 348.7516 0011121 196.5663 163.5164 14.69089775520417
RS-12/13
1 21089U 91007 A 93327.59616256 0.00000030   25224-4 0 6146
2 21089 82.9217 163.9135 0028927 323.6427 36.2770 13.74030145140417
AO-13
1 19216U 88051 B 93324.87971886 -.00000221   10000-4 0 8153
2 19216 57.8676 283.0185 7211074 328.8644   3.5221 2.09724867 10148
UO-14
1 20437U 90005 B 93329.65790977 0.00000093   43895-4 0 9147
2 20437 98.6035 52.0806 0011930 69.3207 290.9251 14.29805964200504
AO-16

```
1 20439U 90005  D 93329.65139180 0.00000078           38188-4 0  7142
2 20439  98.6116  53.1033 0012281  69.9146 290.3351 14.29862845200515
DO-17
1 20440U 90005  E 93329.69541395 0.00000081           39082-4 0  7141
2 20440  98.6133  53.4054 0012278  69.3547 290.8917 14.30000149200535
WO-18
1 20441U 90005  F 93329.66728536 0.00000066           33235-4 0  7151
2 20441  98.6131  53.3931 0012865  69.5507 290.7020 14.29977633200530
LO-19
1 20442U 90005  G 93325.67080327 0.00000099           46017-4 0  7134
2 20442  98.6146  49.6483 0013250  80.8874 279.3806 14.30069500199976
FO-20
1 20480U 90013  C 93325.97912877 -.00000005           14514-4 0  6103
2 20480  99.0202 152.1718 0541163  89.0188 277.2925 12.83222068177550
AO-21
1 21087U 91006  A 93327.46610100 0.00000084           82657-4 0  3702
2 21087  82.9432 294.9482 0034102 299.3528  60.4149 13.74528481141311
UO-22
1 21575U 91050  B 93329.66348198 0.00000110           43938-4 0  4140
2 21575  98.4552  43.0587 0007468 171.3856 188.7451 14.36867889123851
KO-23
1 22077U 92052  B 93325.56659606 0.00000000           10000-3 0  3101
2 22077  66.0893 354.6876 0005267 339.3077  20.7715 12.86281948 60088
Arsene
1 22654U 93031  B 93321.93138545 -.00000051           10000-3 0  2107
2 22654   1.4185 113.8817 2935300 161.0091 211.2000  1.42195961  2757
KO-25
1 22827U 93061  E 93325.63062458 0.00000131           60982-4 0  2756
2 22827  98.6738  38.3070 0010219  83.4992 276.7343 14.27794239  8078
IO-26
1 22826U 93061  D 93325.63461159 0.00000078           39608-4 0  2139
2 22826  98.6764  38.3197 0010035  94.7836 265.4492 14.27693538  8074
AO-27
1 22825U 93061  C 93325.63865674 0.00000077           39483-4 0  2127
2 22825  98.6761  38.3168 0009527  93.6148 266.6130 14.27591127  8079
PO-28
1 22829U 93061  G 93299.20720744 0.00000225           10695-3 0  2074
2 22829  98.6741  12.0806 0010509 157.5898 202.5757 14.27978468  4306
Mir
1 16609U 86017  A 93329.00833400 0.00005257           70218-4 0  5983
2 16609  51.6175 131.5118 0004921  24.8845 335.1502 15.58670399444190

Keplerian bulletins are transmitted twice weekly from W1AW.
The next scheduled transmission of these data will be Saturday,
December 4, 1993, at 2330z on Baudot and AMTOR.
NNNN
/EX
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End of Ham-Space Digest V93 #99
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